Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada

Canada

Agri-Innovators Committee Report
to the Minister of Agriculture and Agri-Food

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Agri-Innovators Committee - Report to the Minister of Agriculture and Agri-Food.

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SUMMARY

The Agri-Innovator Committee sees great promise in the future of Canada's agriculture and agri-food sector. To realize the sector's full growth potential, we need to maximize innovation capacity across the entire value chain. While many stakeholders have a role to play in advancing innovation in the sector, industry must drive innovation with governments as supporting players.

The main long-term innovation challenge facing the Canadian agriculture and agri-food sector is chronic underinvestment in research and development (R&D). To address this issue, concerted action must be taken on the four themes identified in this report. Detailed recommendations are provided.

Regulatory Reform

Simply removing regulations is not the solution to achieving regulatory reform. A continuous process of modernization is required that is aligned domestically and internationally. Regulatory modernization initiatives are critical to enable Canada to signal that it is "open for business."

An Investment Climate Conducive to Innovation and Competitiveness

A pro-business investment environment is a key driver to support industry-led innovation. Overall, economic considerations such as access to capital, labour, markets and technology, along with competitive taxation rates, are important for creating the conditions that encourage increased investment.

Public-Private Collaborations

To have the greatest impact, governments, universities and private sector partnerships are required to drive innovation along the value chain and across the innovation continuum (from research to commercialization).

Entrepreneurial Culture

There is a changing philosophy among early adopters, with a shift in mindset from a "production focus" to understanding markets and consumer demand. The challenge for the sector is to fully embrace this philosophy. In addition, Agri-Innovator Committee members recognize that the motivation and ability to seize new opportunities depends to a large degree on industry's ability to raise awareness of agricultural opportunities in order to attract entrepreneurs, investors and highly qualified people who can assist in positioning Canada as a global innovation leader.

Overall Committee Recommendations

Committee deliberations on the four themes resulted in the following six overarching and inter-related recommendations:

1. Canada needs a competitive business environment to become a destination of choice for investment, especially in R&D and value-added processing.
2. A "fast-to-market" mindset among governments, academia and industry is critical to compete in global markets.
3. A modern science-based regulatory environment is a key component of a competitive business environment that enables access to appropriate inputs and maximizes global market access opportunities. Alignment across various jurisdictions within Canada is necessary.
4. Better coordination, collaboration, and leveraging of resources, as well as a customer-driven focus are achievable through R&D partnerships and clusters involving government, academia and industry.
5. Benchmarking is an important tool for understanding our current capacities and assessing them against those of our competitors (e.g., adoption of new products, practices, processes and technologies) as well as for ensuring more productive use of existing and future resources.
6. Building awareness of the opportunities in the agriculture and agri-food sector as well as explaining the role of modern agricultural technologies, and Canada's robust approval processes for food and novel production techniques will be critical to support an innovative sector.

AGRI-INNOVATORS COMMITTEE REPORT

1.1 Introduction

The Agri-Innovators Committee was announced in September 2013 to provide expert advice on agriculture research and development. The Committee is the first national advisory body to provide advice to the Minister on agricultural innovation.

The rewards of getting innovation right

The "carrot trimmer" reduced yield losses due to schlerotina rot by 80% since 2008. The cost of one pass of the trimmer is $5 per acre compared to $20 per application of pesticide

University of Guelph collaborated with producers, processors and government to develop DHA-enriched milk commanding a 15-30 % premium in dairy cases across Canada.

Source: AAFC, 2013

Committee members see great promise in the future of Canada's agriculture and agri-food sector. At the same time, we recognize the many challenges the sector faces, including increased competition from low-cost producing nations, a high Canadian dollar, rising input costs, and energy concerns. Understanding the cost competitive issues affecting value chains vis-à-vis the situation of our competitors will be essential to remaining globally competitive. We strongly feel that the sector's growth and continued competitiveness will be greatly dependent on our ability to maximize our innovation capacity across the entire value chain, from high-performing inputs through to exporting and creative engagement with customers. To achieve the sector's full innovation potential, we cannot emphasize enough the importance of having a competitive business environment that is both pro-innovation and pro-investment and acts as a key driver for industry-led innovation.

Innovation is actually a simple concept. To us, it means producing value from the creation and adoption of new technologies, products, processes and business models. Research, development, commercialization and adoption are all critical elements of innovation. In spite of the relatively straightforward concept involved, making "innovation" happen in a systematic way is enormously complicated. We recognize the complexity of the Canadian innovation system and the inherent challenges in making it work in an integrated and comprehensive way.

Although many different players are involved in innovation, industry must drive innovation with governments as supporting players. Accordingly, several principles need to be applied as we move forward, namely:

- industry and commercial opportunity must drive innovation priorities;
- governments collectively have a critical role to play in creating the right conditions to incent and reward innovation and innovators;
- innovation is not realized until the new product, process, etc. is commercialized or adopted, hence any investment in innovation has to have a coherent implementation strategy;
- successful innovation requires a plan that encompasses the entire innovation continuum and recognizes which players will need to participate and when; and

- there are gaps in the innovation continuum where government has a unique and essential role to play, because the results cannot be monetized fast enough to suit the private sector, or because the innovation cannot be monetized at all (e.g., zero-till).

The main long-term challenge facing the Canadian agriculture and agri-food sector with respect to innovation is chronic underinvestment. We believe that private sector underinvestment in innovation is the result of a confluence of factors, including a challenging regulatory environment, a tepid investment climate, a general absence of identified partnership roles and structures to promote collaborative partnerships, and a risk-averse business culture. These are clearly not separate or isolated factors, but ones that interact together leading to less than optimal investment in innovation. This is becoming an acute issue which governments need to address by rethinking and revising their role in innovation systems and their capacity to provide financial support.

To address these issues, we have identified four key themes: regulatory reform; an investment climate conducive to innovation and competitiveness needs; public-private collaborations or innovation clusters; and an entrepreneurial culture.

Committee deliberations within these four priority areas gave rise to six overarching and inter-related pieces of advice that would collectively strengthen Canada's agriculture and agri-food innovation ecosystem and advance innovation in the sector.

1.2 Overarching Advice to Advance Innovation in the Sector

1.2.1. Canada needs a competitive business environment to become a destination of choice for investment, especially in R&D and value-added processing.

1.2.2. A "fast-to-market" mindset among governments, academia and industry is critical to compete in global markets.

1.2.3. A modern science-based regulatory environment is a key component of a competitive business environment that enables access to appropriate inputs and maximizes global market access opportunities. Alignment across various jurisdictions within Canada is necessary.

1.2.4. Better coordination, collaboration, and leveraging of resources, as well as a customer-driven focus are achievable through R&D partnerships and clusters involving government, academia and industry.

1.2.5. Benchmarking is an important tool for understanding our current capacities and assessing them against those of our competitors (e.g., adoption of new products, practices, processes and technologies) as well as for ensuring more productive use of existing and future resources.

1.2.6. Building awareness of the opportunities in the agriculture and agri-food sector as well as explaining the role of modern agricultural technologies, and Canada's robust approval processes for food and novel production techniques will be critical to support an innovative sector.

Benchmarking can be used to establish a baseline for Canada vis-à-vis its major trading partners and to better identify the best practices concerning the four priority areas discussed below. Members indicated that Statistics Canada's Census of Agriculture can be harnessed to support ongoing benchmarking efforts.

2.1 Theme: Regulatory Reform

The Minister of Agriculture and Agri-Food specifically requested that the Committee identify key systemic regulatory issues that are inhibiting the advancement of innovation in the agriculture and agri-food sector. Committee members identified the issues listed below.[1]

Canadian Federation of Independent Business report, 2013 puts "red tape" at the top of the list of farmers' concerns (79%)

Seventy-two per cent indicated that the burden of red tape has increased over the past 3 years, compared to 55% of other business owners. Eighty-seven per cent of agri-business owners say excessive regulations add stress to their lives, compared to 62% of other business owners. Sixty-eight per cent say red tape discourages them from growing their business, compared to 62% of other business owners.

Source: Canadian Federation of Independent Business Report 2013

2.1.1. Efficacy: More detailed analysis is required to determine whether government oversight is necessary to ensure the efficacy of products or whether, in some instances, the marketplace should play a key role.

2.1.2. Regulatory Burden: Government should increase collaboration and regulatory alignment with trading partners to streamline approval and facilitate access to the best agricultural inputs.

2.1.3. Regulatory Efficiency: Regulators should use the fastest and best regulatory tools, such as Incorporation by Reference, international standards, and outcome-based regulations.

2.1.4. Science-based Regulatory System: Maintaining a science-based approach has many advantages. However, new technologies need to be better understood by consumers and, in this regard, government and industry have important roles to play in communication and science to dispel myths.

2.1.5. Regulator and Regulated Interface: Regulators should continue the push toward increased transparency and predictability to improve the interface with businesses.

2.1.6. Small Business Constraints for Compliance: Government should pursue outcome-based rather than prescriptive regulations in order to lessen the regulatory burden on small businesses. Regulatory enforcement should provide a degree of compliance flexibility as industry works to resolve issues involved in meeting regulatory obligations.

2.1.7. Novelty: Further review of Canada's approach to novelty is warranted given that products not approved in Canada sometimes receive approval in other countries. In addition, there is a need for a consistent definition of novelty to ensure that industry understands the applicability and compliance requirements.

[1] See Annex A for more detail on the Committee's discussion on these issues.

2.2 Summary of Committee Discussions

A modern regulatory environment is not only crucial for health and safety, but also for fostering innovation, encouraging competitiveness, enabling market access and attracting research and investment. The current regulatory system is generally viewed by industry as too slow, unpredictable and expensive and as not creating a level playing field with our competitors. Burdensome approval processes hinder Canadian access to more efficient and effective products of innovation (e.g., crop inputs) and discourage private sector investment in Canada. Furthermore, outdated and prescriptive regulations limit the adoption of innovative business practices, processes and technologies. It is our experience that the Canadian regulatory regime is not keeping pace with innovations in the sector.

Simply removing regulations is not the answer, given their critical importance for ensuring the safety of food and feed, and for enabling market access for Canadian exports. However, smarter, better, more responsive regulation is essential.

The lack of alignment between federal, provincial and municipal regulatory requirements increases the cost and regulatory burden of starting new agri-businesses in Canada. This lack of alignment makes it difficult to do business in Canada and is likely having a negative impact on Canada's agri-investment climate and entrepreneurial culture.

> Health Canada's vision is to transform nearly a dozen outdated frameworks into an efficient, transparent, and comprehensively aligned regulatory system.
>
> Source: Health Canada Presentation to the Committee, February, 2013

Science and technology strategies could be used to establish links between innovation and regulation, which might lead to better alignment of federal, provincial and municipal regulations. This could reduce the administrative burden on industry. (See the Committee's Letter to the Deputy Minister of Industry Canada in Annex B).

Regulatory modernization must be implemented in an ongoing and aggressive manner to enable investments in science and technology to lead to new ideas that reach the marketplace. Committee members were encouraged by the numerous regulatory modernization efforts currently being undertaken by Health Canada and the Canadian Food Inspection Agency (CFIA), and the work being done under the auspices of the Canada-United States Regulatory Co-operation Council (RCC).

In particular, members were pleased with Health Canada's Strategic Plan that focuses on building a sustainable regulatory system based on risk rather than a rigid classification scheme, and on transitioning from a domestic to an international regulator. For example, under the RCC, joint approvals for veterinary drugs are made through collaboration and sharing of research to arrive at joint Canada/United States decisions.

Members were equally pleased to hear that the CFIA's modernization efforts will reduce unnecessary compliance burden and support innovation while maintaining food safety, as well as environmental and economic sustainability. In particular, the CFIA's focus on outcomes, as opposed to prescription, is laudable.

The pasteurization example used by the CFIA to describe the difference illustrates how innovation is stifled by prescriptive regulations. Current regulations dictate that pasteurization must be achieved by heating a food product to a specific temperature for a specific period of time. This prescription effectively removes the incentive to invest in the development or adoption of a newer, better, cheaper way of achieving the same outcome as with heat-based pasteurization. Other countries and companies can easily leapfrog ahead of Canadian firms in this and myriad other ways, while producing less expensive, more efficient and safer processes and products. That clearly makes no sense.

These types of modernization initiatives support the message that Canada is "open for business," which is critical to attracting private sector investment and building an agri-entrepreneurial culture.

At the same time, members acknowledged the need to allow industry time to adjust to the changes brought about by a number of regulatory modernization initiatives being implemented concurrently. Although well-intentioned, these initiatives could, if not carefully executed, place certain industry players at a competitive disadvantage vis-à-vis their domestic and international competitors.

We understand that these issues are being examined by a sub-committee on regulations under the auspices of the Value Chain Roundtable.

The Canadian Food Inspection Agency has embarked on a transformational change agenda

This is the most comprehensive and far-reaching regulatory modernization effort under way in Canada today. This initiative will strengthen the CFIA's legislation, regulatory programs, and inspection delivery and provide new opportunities for the sector to be innovative and competitive while maintaining public safety and environmental and economic sustainability.

Source: CFIA presentation to the Committee, February, 2013

3.1 Theme: An Investment Climate Conducive to Innovation and Competitiveness Needs

On the basis of discussions in the Committee concerning Canada's investment climate, the following advice is provided:

3.1.1. The Federal Government should pursue opportunities to strengthen Canada's plant breeders' rights to make Canada a destination of choice for investment in agricultural innovation. A competitive intellectual property protection regime will attract foreign investment in R&D in Canada while supporting the entire sector's competitiveness.

3.1.2. Governments should explore ways to provide accessible programming that "moves at the speed of business," and that establishes the right mix of policy and program instruments to leverage private investment, as well as stimulating innovation without distorting the market and biasing investment decisions.

3.1.3. Governments should continue the transformative thrust of *Growing Forward 2* programming and work to simplify the suite of programs, with further client-centric improvements such as Ag Pal.

3.1.4. Explore ways to establish links between Agriculture and Agri-Food Canada (AAFC) innovation programming and those of other government department programs so that industry applicants are better able to identify the complete spectrum of government support.

3.1.5. **Both the federal government and provincial governments should explore opportunities for aligning program requirements** in areas such as application procedures, mutual recognition of due diligence assessments in project review, and ways of collaborating more proactively in assessing applications that cover multiple jurisdictions and departments.

3.1.6. **Government, academia and industry should examine ways to encourage a stronger investment ecosystem with more Canadian "lead investors"**, which is seen as necessary to attract more foreign investment into the sector.

3.1.7. **Industry should forge stronger ties with educational institutions** to attract more highly qualified people into the sector. This could include engaging with students to increase awareness of the wide range of careers in the agricultural sector, from life sciences through primary agriculture and value-added food processing.

3.1.8. **The Federal Government should work with industry and with provincial and municipal governments to increase public understanding of the importance of modern agriculture,** the role of new technologies, and the robust nature of our product approval process.

3.2 Summary of Committee Discussions

A business-friendly and pro-innovation climate provides the necessary environment to enable industry-led innovation and increase the level of sustained private sector investment. While Canada as a whole is doing well at converting research investment dollars into knowledge, we are not as successful at converting knowledge into innovation through commercialization and adoption. To increase commercialization, members noted that not only must chronic underinvestment be remedied, but other non-financial commercialization factors must also be addressed. Government should provide accessible programming that "moves at the speed of business"; establish the right mix of policy and program instruments that leverage private investment; and stimulate innovation without distorting the market and biasing investment decisions.

The Committee emphasized that the investment climate is comprised of a number of key elements that have direct and indirect impacts on the sector's investment attractiveness. Members identified industry's ability to communicate the benefits of a modern science-based agricultural sector that functions within a world-class regulatory system as critical to the sector's investment attractiveness. Committee members also noted the importance attached to the "people" aspect of the sector and how it plays into business investment decisions. More specifically, it was noted that the people aspect encompasses the sector's depth and breadth of partnerships and connectivity, as well as its ability to maintain and attract highly qualified people and skilled leaders from a broad array of disciplines (such as science, finance, agronomy, and human resources) required to support innovation. In addition, a modern intellectual property regime, along with a tax regime that provides the right incentives, helps to create an enabling environment giving the sector a reputation as a place to invest.

Israel has repeatedly ranked among the top 5 countries in global innovation.

Israel's favourable financial environment, which is particularly evident in the ease of access to venture capital (3rd), has contributed to making the country an innovation powerhouse. The uncertainty the young Middle East nation faces has also played its part in developing a culture of adaptability and risk-taking.

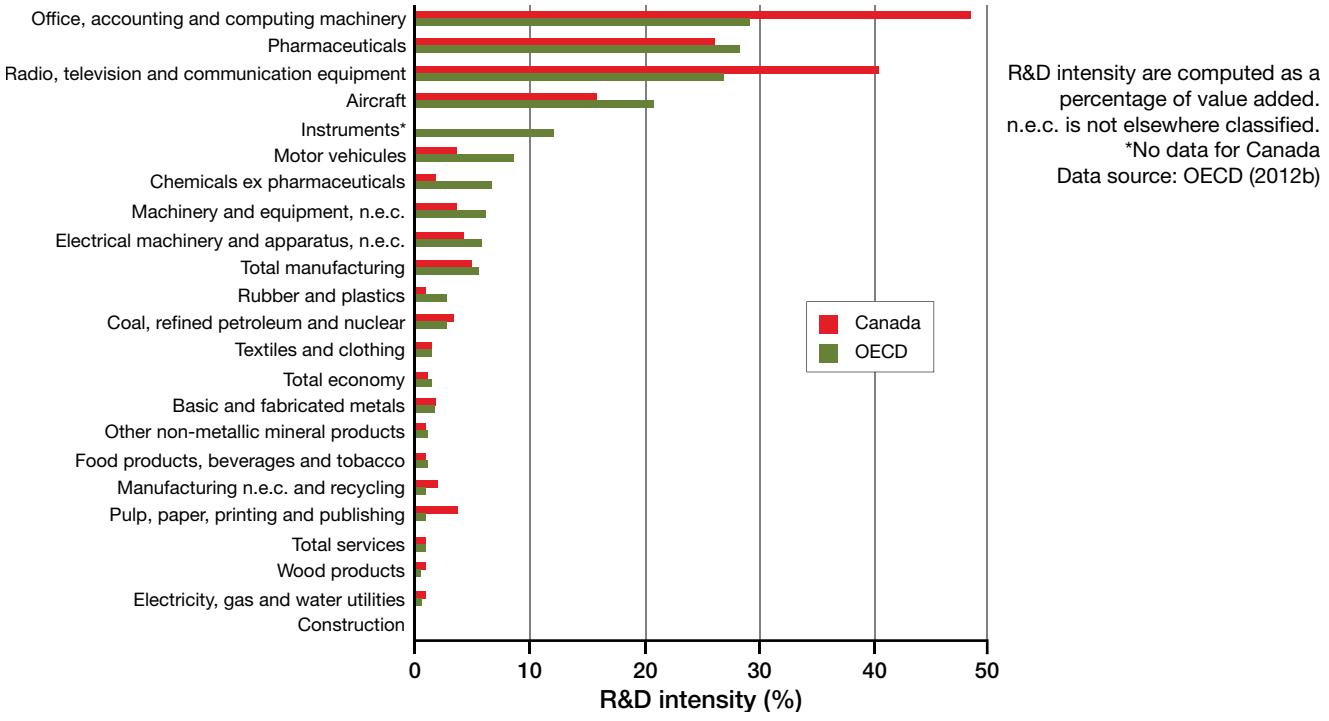
Source: World Economic Forum, The Global Competitiveness Report 2010-11/CNN Money a service of CNN, Fortune and Money

Israel is an interesting example of a country with an impressive venture capital market and a strong entrepreneurial culture. Israeli culture also imparts a "can do" attitude from a very young age. In building its venture capital ecosystem, Israel has from the outset focused on "going global" by helping entrepreneurs establish contacts in the United States. This stands in contrast to Canada's approach of first pursuing domestic venture capital opportunities and then international ones. In addition, back in the 1990s, the Israeli government created funds worth over $220 million to invest in supporting Israeli start-ups and partnering with American and European investors.

The Committee views the investment climate as encompassing both potential investments by an enterprise itself and investments made by outside investors such as venture capitalists and other risk capital fora. As such, business expenditure on research and development (BERD) is included with venture capital availability. While much has been written lately about the global trend toward greater foreign investment in agricultural land, we focussed on the investment climate for innovation in inputs (seed, chemicals, fertilizer); process innovations for primary agriculture (such as precision agriculture applications); investments in end-use improvements (such as the use of biocomposites rather than petroleum-based materials); and food innovations.

Committee members noted that the investment climate for agriculture is improving. Recent trends in global food demand, greater attention to national food security, and alternative markets in the emerging bio-economy have all strengthened pricing along the value chain. This has had a positive effect on cash flows and the ability and desire to invest in innovation. As a result, market forces are improving the investment climate for the sector, keeping in mind that innovation is a long-term process and must be sustained through cycles. However, R&D intensity in Canada is below the Organisation for Economic Co-operation and Development (OECD) average for the food and beverage sector.

Figure 1: R&D Intensities by Industry: Canada and OECD Average, 2006



Business investment in R&D is a key driver of innovation. In Canada, this type of investment (all sectors) declined as a percentage of gross domestic product (GDP) from 1.14% in 2006 to 0.89% in 2011. By contrast, most OECD countries increased their R&D investment intensity over the same time period (STIC 2012). Canadian business R&D investment in the agricultural sector accounts for 0.4% to 0.6% of GDP. In the United States, R&D investment represents 1.1% of GDP.

Venture capital is an important supporting element for innovation. The Canadian agricultural sector appears to be adversely affected by a general lack of awareness and preconceptions among investors (higher or multiple risks, complex regulations, longer time frames to recoup investment, etc.) in comparison with the more attractive information, communication and technology sector. Venture capital investments in Canada funded 2,175 companies with sales of $18.3 billion between 1996 and 2007; however, the vast majority ($15.4 billion) of investment was in information, communication and technology, leaving a "significantly unaddressed deal-flow in the Canadian ag-sector" (Brook and Norland, 2011).

Committee members heard that it is a challenge to get U.S. fund managers to look at Canada as an investment target. To enhance the attractiveness of Canada as a destination for agricultural investment, Canada needs to develop a stronger investment ecosystem with more Canadian "lead investors" investing both domestically and internationally. Currently, those who are involved focus on late-stage investment and many of them direct their efforts toward land acquisition. Committee members were impressed with how the Israeli government encourages companies to invest overseas, initially through risk-sharing and later by encouraging expatriates to help bring venture capitalists to Israel to invest.

As part of building a competitive business environment, Canada must be seen as a destination of choice for investment in agricultural innovation. To attract foreign R&D investment and enable Canada to be seen as a place to invest, government needs to make Canada's regulatory systems world class so that they are perceived as a Canadian advantage or "magnet" to attract more agricultural R&D investment. More specifically, Canada needs to become the global first stop in seeking regulatory approval.

It is important for government, academia and industry to work together to address the critical success factors for attracting investment. The Committee has identified the regulatory system, the ability to attract and retain highly qualified people, and access to key markets as the main success factors.

Intellectual property protection

Committee members also recognized the need for effective intellectual property (IP) protection to incent and reward innovation and noted that enhanced plant breeders' rights (PBR) would be a step forward to enabling Canada's efforts to remain a world leader in agricultural innovation. By creating a competitive and friendly business climate, which includes IP protection that enables and promotes private sector investment, government will be providing an economic stimulus to the entire sector. In addition, it will help to attract foreign R&D investment to Canada while supporting the entire sector's efforts to remain globally competitive.

Highly Qualified People (HQP)

Across all sectors in Canada, the demand for highly qualified and skilled workers is on the rise and is expected to keep growing. As the agricultural sector becomes more and more knowledge-intensive, the demand for HQP is expected to increase. Enrolment in agricultural colleges appears to be declining, however, and Canada is competing in the global marketplace to attract talent. In specialized areas such as canola breeding, there is a particularly great need to attract and engage students and work closely with universities to promote awareness of careers in the agricultural sector.

It is important to have a better understanding of Canada's current HQP capacity and of what measures need to be taken to ensure the sector remains competitive and an attractive destination for investment through leading-edge research. As such, Committee members support the development of stronger linkages between universities and industry as this will help universities better understand industry's current and future labour market needs. This will contribute to the development of a virtuous circle where the presence of HQP will attract further R&D investment, and further R&D investment will help to attract more HQP.

Canada's graduation rates in science disciplines need to at least double to meet our innovation needs, even after allowing for increases from other sources, such as immigration and retraining.

Source: STIC 2012

Streamlined services and programs

Committee members were briefed on the proposed programs and services under *Growing Forward 2* and fully support the direction it embraces. Although it was acknowledged that accessing services and programs can be challenging to navigate and do not always operate at the speed of business, members were impressed with the simplified suite of programs under *Growing Forward 2* and the client-centric improvements such as AgPal.

Streamlined "across-the-board" government programming helps the agriculture and agri-food sector access key services and funding in a timely manner. Committee members mentioned the importance of establishing links to other government departments' programs, such as the National Research Council's Industrial Research Assistance Program (IRAP), to help stakeholders access key services and funding quickly. The need for alignment with provincial and territorial programming is another point that was raised. Governments should work toward aligning application requirements and mutual recognition of due diligence assessments, and collaborate more proactively on assessing applications that cover multiple jurisdictions and departments.

Canada has the second lowest overall tax burden for businesses in the manufacturing sector (includes agri-food) among 14 countries (30% lower burden than in the U.S.)

For the agri-food sector, a representative food processing operation (canned foods / confectionary products) was modelled (with specific operating parameters) for 14 countries. Canada ranked fifth among the mature-market countries assessed, with business costs estimated to be 2.2% lower than in the U.S.

Source: KPMG's Competitive Alternatives Biennial Guide to Comparing Location-Sensitive Business Costs, 2012

Tax and financial incentives

During Committee deliberations, the competitiveness of Canada's tax regime vis-à-vis the U.S. was highlighted as an area of concern. KPMG publishes a special report focusing on tax costs which compares and ranks the total tax burden (including corporate, capital, sales, property, and miscellaneous taxes as well as statutory labour costs) faced by companies in a number of countries and cities. Canada is ranked as having the second lowest tax burden overall (behind India) across the 19 industries, with total tax costs estimated to be 40% lower than in the United States.

In the manufacturing sector alone (which includes food processing), Canada is ranked as having the second lowest tax burden, with total tax costs around 30% lower than in the U.S. Other studies likewise have confirmed Canada's superior tax competitiveness. According to a 2012 annual global tax competitiveness ranking study, Canada has the lowest marginal effective tax rate among the G-7 countries, promoting greater investment and improved economic growth.[2]

4.1 Theme: Public-Private Collaborations

Based on discussions with several cluster leaders, the Committee has identified some lessons learned and related advice.

Vineland Research and Innovation Centre's (VRIC) Board of Directors spearheads the governance, expertise and ideas that provide the foundation for the networks of interdependent relations between science, industry and consumers.

The Board provides the means for achieving a new model in agricultural R&D that is neither private nor public, but represents a radical departure from the previous top-down models associated with government and producer associations. The independence derived from the Board experts has been credited with providing the governance that drives the open and accountable structure of VRIC—the key to innovation.

Source: Vineland Research and Innovation Centre, Presentation to the Agri-Innovators Committee, February 2013

4.1.1. Government, academia and industry partners should identify clear roles and develop formalized and committed governance/structures (e.g., boards of directors). Producer participation on governing boards is needed to help ensure that innovation strategies are aligned with industry and market needs.

4.1.2. Government and industry should explore ways to create a more stable, long-term funding environment and better administrative arrangements to allow the establishment of complex and successful collaborations. Industry should consider implementing long-term funding models such as check-off structures. Government needs to provide more predictable funding giving certainty to multi-year projects.

4.1.3. There is a need to break down the silo mentality. Public-private collaborations entail a new business model based on networks that are linked through a web of contracts and projects. These more complex collaborations involve all players along the value chain from the outset (avoiding fragmentation across the country and supporting the attainment of a critical mass) and span the entire innovation continuum from R&D to commercialization.

[2] Mintz, Jack and Chen, Duanjie (2012), "2012 Annual Global Tax Competitiveness Ranking – A Canadian Good News Story," The University of Calgary's School of Public Policy

4.1.4. **There must be a fair allocation of risk and reward among players** with common objectives, active participation, and sharing of authority, risk, responsibility, accountability and benefit. In principle, risk should be carried by the party best able to manage it.

4.1.5. **Partnerships should reflect an alignment between industry priorities and funding levels enabling a more coordinated and strategic approach to R&D funding.** Such an approach involves continuously challenging the science to evaluate effectiveness in addressing industry's top priorities and to ensure that investments contribute to maximum value creation. Creation of a feedback loop between scientists and end users (e.g., distributors, retailers and business services) is essential to help identify research priorities that will lead to marketable products or processes.

4.1.6. **Intellectual property rights (IPRs) should be effectively managed by establishing appropriate agreements/arrangements between collaborating parties in order to protect intellectual property while maximizing the benefits from joint R&D initiatives.** IPRs also allow the partners to manage the output from their alliance and define the limits of the partnership's rights with respect to technologies.

4.1.7. **Government, universities and industry should encourage the development of skills corresponding to current and future career opportunities within the sector**, in order to avoid a shortage of skilled labour, capital flight and loss of know-how.

4.1.8. **Government, universities and industry should explore ways to develop efficient knowledge transfer and communication mechanisms.** Successful public-private collaborations are highly effective at disseminating results within their networks as well as communicating success stories and demonstrating sound business management in order to attract investors.

4.1.9. **Government, universities and industry should develop performance evaluation models and metrics to evaluate the effectiveness of programs**, measure progress against objectives, enhance accountability, and demonstrate results that are critical for ensuring continued funding and investment attraction.

4.2 Summary of Committee Discussions

Clusters as a model of collaboration

Developing sustainable R&D funding models is a challenge that sector leadership must meet to fully support the potential of Canada's agriculture and agri-food industry. This is particularly important given how central R&D is to the sector's ongoing competitiveness, and in light of the investments Canada's competitors are making.

With respect to the risk of long-term erosion of research capacity and funding, we discussed several models of collaboration. The collective efforts of government, universities and private sector partnerships are essential to promote innovation along the value chain and across the innovation continuum (from research to commercialization). Even in the early stages of R&D, partnerships between industry, academia and government are essential to instil a drive-to-collaboration and a sense of fast-to-market. Clusters are seen as a model that encourages organizations to mobilize and coordinate the efforts of a critical mass of scientific and technical capacity in industry, government and academia in keeping with sector strategies and priorities that are aligned with market and consumer demands.

The importance of public-private-producer partnerships (P4s) in the agricultural pre-competitive research space was identified as a key ingredient of a strong investment climate. Committee members were told that Canada could better leverage the use of such partnerships at the pre-competitive stage, for example when undertaking wheat research with global partners. Additionally, sector leaders were urged to look at the health/pharmaceutical R&D space for ways to enhance the use and effectiveness of public-private partnerships and thereby improve Canada's overall attractiveness as an investment destination.

In addition, several foundational and sustainability challenges were highlighted. In general, it takes 15 years for a P4 to generate substantial alternative sources of revenue (which creates long-term dependence on public funds). There is a need to break down silos and create new business models based on networks linked through a web of contacts and projects. Also, P4s must co-exist alongside traditional research structures and therefore compete for the same limited resources.

Benefits of partnerships and collaboration

Companies create and join networks in order to take advantage of sector opportunities that respond to market and consumer demands, and ultimately to increase their profitability and competitiveness. Both virtual and physical agricultural clusters offer many benefits, including their potential to:

- Increase productivity and efficiency by building a critical mass of expertise and allowing access to specialized inputs, employees, information, institutions, and "public goods" such as training programs and training institutions;
- Act as a means to efficiently channel government funding to increase the sector's competitiveness;
- Create an enabling environment for co-operation among firms;
- Enable more rapid innovation through co-operative research, knowledge creation among multiple institutions and players and diffusion of best practices;
- Facilitate commercialization by providing more opportunities for new companies and new lines of business;
- Develop and accelerate technology transfer of new production practices; and
- Supply talent, mentors and management expertise, and facilitate connections to global value chains.

In particular, physical clusters, regional innovation hubs, incubators, and accelerators can help support business creation and facilitate knowledge spillovers, technology transfer, and innovation.

By providing indirect support to firms, clusters also attract domestic and foreign investment as investors are more likely to invest in companies that operate within regionalized clusters.

The Beef Science Cluster has made beneficial contributions toward:

- alignment of the largest government (AAFC) and industry (BCRC and Alberta Beef Producers (ABP) funders;
- improved collaboration between both funders and researchers;
- focus on industry leadership to deliver a "research portfolio" addressing a set of key research outcomes, not just a collection of projects;
- capacity development in critical areas; and
- focus on technology transfer.

Source: Beef Cattle Research Council, Presentation to the Agri-Innovators Committee, June, 2013

Public-Private-Producer Partnerships (P4s): Now and for the future

P4s provide a structure and process enabling producer associations to fund and direct R&D and technology commercialization and represent the new science-business model, where technology transfer is built into projects and programs rather than being based on a top-down system. International competition, global trade regimes, technology and demographics have created the conditions necessary for this new business model in agriculture and agri-food which can link R&D to producers, processors and consumers in a way that is beyond the capabilities of the vertically structured public and private sectors.

Scan of research and development sector capacities

A better understanding of the sector's capacities will result in more productive use of existing and future resources and possibly accelerate the transfer and adoption of new innovative products, practices, processes and technologies across the sector. In addition, a scan would assist in identifying gaps and areas that can be targeted to increase efficiency and leverage opportunities. For this reason, the Committee endorses the capacity scan of programs, infrastructure, and highly qualified people in government, academia and industry which is currently under way at Agriculture and Agri-Food Canada. The information that is obtained will help to build a common strategic direction for government and industry and facilitate priority setting with the aim of advancing innovation in the sector.

As members of a Committee representing the agriculture and agri-food industry, we recognize that the sector is diverse and that not all stakeholder innovation requirements and capacity are equal. Accordingly, the members expressed a strong interest in identifying sector capacities, including both strengths and opportunities (the "what," "with whom," "where" and "how" in the provinces and academia) in order to focus on Canadian agricultural strengths and opportunities that align with key priorities.

5.1 Theme: Entrepreneurial Culture

On the basis of discussions related to Canada's entrepreneurial culture, the Committee has developed the following advice:

5.1.1. An inventory of the existing sources of market and consumer intelligence should be developed to communicate information across various sectors.

5.1.2. Marketing and consumer research should be at the forefront of the innovation continuum to support R&D investment decisions that respond to end-use market and consumer demands.

5.1.3. Sector leaders should continue to attract both experienced innovators and young entrepreneurs to the agricultural sector, as people are the most important asset for innovation.

5.1.4. Government and industry should work together to develop options to increase awareness of the rate of return on agricultural research and to promote awareness within the risk capital community of the untapped innovation potential that exists within the sector.

5.1.5. Industry leaders, supported by government and academia, should make greater use of innovation metrics to demonstrate the value creation resulting from innovation.

5.1.6. **Industry leaders should work with academia to identify and develop the skills and capacities needed to form management teams** that can seamlessly integrate new business models.

5.1.7. **Industry leaders should be encouraged to innovate across all areas of competition**, including organizational innovation, by establishing a supportive environment for leadership and risk-taking, and by putting in place the governance and other structures required to support innovation.

5.1.8. **Scientific literacy should be promoted** to raise the profile of modern agriculture.

5.2 Summary of Committee Discussions

An entrepreneurial culture is vital for encouraging innovation and the early adoption of new products, practices, processes and technologies, in order to drive a competitive and sustainable sector. People play a central role in innovation, but the knowledge they possess is not sufficient on its own to turn research into innovation. They need to have the motivation and ability to seize opportunities based on the available store of knowledge. Entrepreneurs have many requirements for success, such as the availability of markets, people and financing, and they need to be able to pull everything together to pursue opportunities. This requires a business environment that favours and supports entrepreneurialism.

Attitude is a key component

The Committee was briefed on the importance of "attitude" and how it is key to an entrepreneurial culture, more so than technology or logistics or having the most efficient processes in terms of sector innovation. Entrepreneurs with the right attitude feel personal accountability for their own enterprise and view themselves as part of an interconnected system. This is particularly relevant for well-functioning value chains, which recognize that individual links in the chain cannot operate without taking into account the impact of their actions on the chain as a whole. The belief that each component of the value chain affects the chain as a whole, strengthens connectivity and makes "doing business" as easy as possible. This connects the value chain from the producer to the end-use consumer.

Appropriate management capacity is a complement to the right attitude. Expert presenters indicated that one of the greatest challenges in innovation is seamlessly integrating new business models into existing ones. It was noted that while innovation in Canada is robust, it can be difficult to find the right management group to take an innovative idea to the next level, i.e., to transition the management team from the initial innovation to one that evolves in response to the changing dynamics of the marketplace. It was also pointed out that enterprises need to continuously and seamlessly adjust their business model and people as they move through different stages in the innovation process.

Changing attitude in the agricultural sector

There is a changing philosophy among early adopters, with a shift in mindset from a "production focus" to understanding markets and consumer demand. The challenge is for the sector to embrace this philosophy at both the primary and processing levels.

Given the growing importance of understanding markets and consumer demand, the dissemination of market and consumer intelligence is critical to the advancement of innovation in the sector. The Committee received expert advice indicating that marketing research should be at the forefront of the innovation continuum in order to guide R&D investment decisions and make sure that they are aligned with end-use market and consumer demands. Judging from the discussions we have had in the Committee, access to this information appears to be uneven across the sector.

Agricultural awareness

For decades, the agriculture and agri-food sector has not held much attraction for entrepreneurs, investors and youth (compared to the high-tech sector) but that may change now that agricultural markets are strengthening, farm and food operations are increasingly more high-tech and modernized, and awareness of the central role that agriculture plays in "feeding the world" is growing. This calls for more effective management of our natural resources.

Sector leaders should maintain their efforts to attract both experienced innovators and young entrepreneurs to the agriculture and agri-food sector, as people are the most important asset for innovation. Experts indicated that a culture of innovation needs to be promoted among the next generation through elementary and high school programming and university curricula so we will have strong candidates studying for doctoral degrees in agricultural science at our universities.

To address the issue of underinvestment by the private sector, members raised the need to increase awareness of the return on investment from R&D. There is a need to promote value creation and success to attract private sector investment. Rates of return from agricultural research on specific crops have been found to be 30%-50% or greater. Several reports claim an average benefit to cost ratio of 20:1.[3] These high rates of return are consistent with the findings of international studies. Even with high rates of return, there is still an underinvestment in innovation. Greater awareness of the benefits of innovation and the dividends it can pay is recommended.

[3] Gray, Richard and Stavroula Malla. *The Rate of Return to Agricultural Research in Canada*. Canadian Agricultural Innovation Research Network, 2007.

A Summary of the Rates of Return of Agricultural R&D Based on Canadian Literature

SECTOR	RESULTS B/C: Benefit/Cost ratio
Wheat (Scott et al., 2005)	**Producer** returns from the Western Grain Research Foundation (WGRF) check-off: B/C $4.4
Swine (Thomas et al., 2001)	**Social** returns from federal research only: B/C $22.4 **Social** returns attributed to all Canadian research B/C: $6.4 **Social** returns attributed to all Canadian research and spillovers B/C:$6.6
Pulses (Gray R.et al., 2008)	Total **producer** returns from Saskatchewan Pulse Growers (SPG) check-off: B/C $27.8 Total social returns from all SPG expenditures: B/C $24.6
Beef (Cranfield J., 2010)	Canadian cattle **producer** returns from National Check-off (NCO) to research and marketing activities: B/C: $9 Canadian cattle **producer** returns from NCO to research only B/C $46

Source: Research and Analysis Directorate, AAFC

Although these high rates of return demonstrate that Canadian agricultural R&D is generating significant value, they are also an indication of significant underinvestment.

Members were concerned that the venture capital and investment community may perceive some distinct risk factors and that it lacks awareness of the agriculture sector and of the rate of return on investment.

The importance of innovation metrics and benchmarking

The Committee discussed the importance of benchmarking as a tool for identifying strengths, weaknesses and opportunities that can contribute to positioning Canadian agriculture and agri-food as a global leader in innovation. Further refinement of innovation metrics and the use of benchmarking to compare Canada's performance with that of its leading competitors (e.g., regulatory systems, innovation systems, and cost of production systems) is encouraged. By using other countries' models of innovation as a source of inspiration, Canada may avoid some of the obstacles to innovation. Key areas where benchmarking could help the sector better understand competitiveness issues include:

- The measures that other countries implement to create a culture of innovation (tax regimes/financial incentives to favour innovation in agriculture and agri-food).
- The differences in regulatory systems between Canada and its competitors.
- Canada's current innovation capacity and the areas in which it has a comparative advantage.

- Identification of a broader range of innovation metrics to enable outcomes to be evaluated over time (e.g., return on investment and value creation).

According to a survey by the Conference Board of Canada, after a lack of cash, the greatest obstacle to financing is a lack of metrics and benchmarking to illustrate the value of innovation.[4] The survey indicates that close to 47% of businesses have no formal innovation management process in their company. Those that did were more successful in terms of five-year revenue growth than those that did not. Almost 40% of companies do not measure innovation performance at all, 30% use very few innovation metrics, and less than 8% employ 6 to 8 metrics in metrics-based innovation management.

The use of metrics is critically important for creating an entrepreneurial culture and allows entrepreneurs to better manage what is measured and take action based on the findings. Currently, there is a lack of metrics and use of benchmarking to demonstrate the rewards of innovating, and while this may apply to food processing more than to farming, producers tend to take a wait-and-see attitude and adopt innovative products, processes, practices and technologies more slowly than their counterparts in other countries.

Sector challenged to counter misinformation

Members wondered whether greater awareness of and more information on modern agriculture such as agricultural biotechnology, food irradiation, new plant-breeding techniques, along with the regulation of these aspects in Canada, would lead to greater consumer understanding of these technologies based on sound science.

Scientific literacy can play an important part in establishing a welcoming entrepreneurial culture and investment climate. Concern was raised over the perceived widening urban-rural divide in terms of general understanding of the need for modern agricultural technologies such as pesticides and biotechnology.

[4] Good, Bruce, *The State of Firm-level Innovation in Canada*, Conference Board of Canada, 2013

ANNEX A

SYSTEMIC REGULATORY ISSUES THAT AFFECT SECTOR INNOVATION

Government role in evaluating efficacy

As part of Budget 2012, a decision was made that the Canadian Food Inspection Agency (CFIA) would continue to verify the safety of fertilizers and supplements but it would no longer regulate their efficacy and quality. Although reducing or eliminating government oversight of product efficacy and allowing market forces to push low-quality products out of the market could increase flexibility, reduce costs and red tape for the industry, and streamline the approval process to reduce time-to-market for new products, it could also lead to questionable products, and allow lower quality foreign products to enter the Canadian market.

Therefore, more detailed analysis is required to determine whether government oversight of product efficacy is necessary, or whether market forces should be allowed to prevail, provided industry has the capacity to undertake quality assessments. If it is determined that government should focus solely on verifying the safety of such products, safety and efficacy will need to be clearly defined.

Government oversight related to efficacy is still required for products intended for consumer end use, while less oversight is needed for products used as inputs in further manufacturing or processing.

In terms of addressing marketplace complaints, while the market does a good job in most cases as a dispute resolution mechanism, regulators should have a user-friendly portal allowing industry and consumers to lodge complaints, particularly in cases of mislabelled foreign products. Regulators should continue to ensure the accuracy and truthfulness of product content claims.

Reducing regulatory burden and improving access to innovative products through regulatory collaboration and alignment with key partners

The Canada-United States Regulatory Cooperation Council has highlighted the importance of regulatory collaboration and alignment in reducing regulatory burden and improving Canadian producers' access to innovative products. The OECD's Global Joint Review process for agricultural pesticides is a best practice for regulatory collaboration.

A "joint review" refers to the sharing of the evaluation of a pesticide dossier by two or more countries. The participating regulatory authorities examine the work done by the primary reviewers for each particular science discipline, and the end product (ideally a complete monograph or key components of the monograph) is used by all participating countries (and others) as the basis for regulatory decisions.

Members were supportive of Agriculture and Agri-Food Canada's Pest Management Centre (PMC) which uses scientific knowledge and expertise to improve pest management practices for the benefit of all Canadians and the environment. In particular the PMC participates actively in the United States Department of Agriculture IR-4 Project aimed at maximizing harmonized pesticide tolerances for the

U.S. and Canada. Co-operation with the U.S. IR-4 Project through joint initiatives leads to significant resource savings (e.g., a reduction in the number of field and laboratory trials and shorter time frames for submission and registration) through the Joint Review Stream. Regulatory decisions for new uses in both the U.S. and Canada can be announced at approximately the same time, benefiting growers on both sides of the border. In addition, harmonized U.S. and Canadian tolerances/Maximum Residue Limits (MRLs) help remove trade barriers.

This approach also allows new pesticides to be submitted for review in multiple jurisdictions without compromising health or safety standards. While this approach is currently used only in pesticide regulation, the application of this model in other areas of regulation could streamline approval processes and give Canadian producers timely access to innovative products more quickly.

Further harmonization is needed so that Canadian producers can have access to the innovative products at the same time as their competitors. If regulators need to conduct a safety review before allowing products to enter the Canadian market, the time it takes the products to gain access should not be affected.

Members expressed a desire to see Canadian regulations benchmarked against those of key trading partners and competitors (for example, common terms and definitions, science requirements).

Changes may be required to ensure better alignment between Canada's regulations and those of its trading partners, but this should be done in a way that gives Canadian industry sufficient time to adapt.

We encourage regulators to broaden the opportunities for conducting joint reviews, and where that is not possible, to leverage work already conducted in other countries that have systems which inspire a high level of confidence.

Optimizing the use of tools to increase regulatory efficiency

The regulatory process is slow. An amendment to a regulation typically entails the development of another regulation which can take 18 to 24 months. This can result in delays in access to new products and decreased productivity and innovation.

The broader use of regulatory tools such as incorporation by reference (IbR) can help to optimize the efficiency of the regulatory system. IbR is a legal drafting technique that involves incorporating material contained in another source into a set of regulations without having to actually reproduce the material word-for-word. It facilitates harmonization with international obligations as well as federal legislation and provincial regulations. IbR can save time and resources and minimize the need for frequent updates, thereby decreasing the amount of time that industry has to wait for regulatory changes to take effect.

Outcome-based regulations are generally regarded as being more flexible and innovative in that they allow industry to use a wider variety of technologies or methods to achieve desired outcomes. Whereas a prescriptive regulation defines the exact method of meeting a requirement, outcome-based regulations state what needs to be achieved. Although outcome-based requirements can encourage companies to go above and beyond the minimum regulatory requirements, small and medium-sized enterprises (SMEs) tend to prefer the more prescriptive, predictable conventional regulations.

Private standards-based assurance systems for quality attributes can provide an alternative to public regulation, for example in the area of environmental sustainability, animal welfare and other values-based attributes demanded by some consumers. Governments could consider compliance with a private standard as a factor when allocating inspection resources under equivalent public assurance systems, potentially improving regulatory efficiency. Regulators could also recognize compliance with private standards as meeting some of their requirements, thereby reducing the burden associated with multiple compliance requirements.

Regulators should use the best, most expeditious regulatory tools (for example, IbR, international standards, outcome-based regulations).

Governments should explore the possibility of using private standards/assurance systems within the formal regulatory process and work with industry in this area. Programs such as CanadaGAP provide best practices that should be taken into consideration.

CanadaGAP is a food safety program for companies that produce, pack and store fruits and vegetables. It is designed to help implement effective food safety procedures in fresh produce operations. Certification is the term used by CanadaGAP to describe the determination by a qualified authority that the supplier meets the standard and that its food safety program is being maintained on an ongoing basis. This involves having a third party auditor from the Certification Body visit the operation, review the food safety manual(s) and related records, interview the operator and staff, and assess the company's conformance to the CanadaGAP Audit Checklist. Since the Audit Checklist covers all crop groupings, multi-crop operations may be able to cover their entire production in only one audit. Those who pass the audit are certified under the program.

Certification indicates that the operation has a system of procedures to minimize the risk of product contamination. The Certification Body certifies processes, not products. The auditor gathers evidence to attest to the ongoing maintenance of the food safety system, rather than simply gaining a snapshot at a given point in time.

The Government of Canada's role should be to set the minimum standards required to ensure health and safety and to audit private standards to ensure that the minimum health and safety requirements are met and that these minimum standards are aligned with those of trading partners.

Maintaining a science-based safety assessment regulatory system

Generally, with new and emerging technologies like agricultural biotechnology or food irradiation, the Government of Canada applies a science-based approach in regulatory decision-making, which does not consider socio-economic factors such as domestic and export market impact/acceptance. The approach may be summarized as follows:

- Science-based safety assessment is a government role;
- Industry is best positioned to make decisions concerning commercial introduction by engaging stakeholders along the entire value chain; and
- Producers can select practices and technologies that offer the greatest benefits.

This approach has several important advantages. First, it ensures that new and emerging technologies are safe for people, livestock and the environment. Second, it recognizes that industry, informed by value chain discussions, is best positioned to assess market demand and acceptance of new technologies. Third, it ensures that producers can select production systems and technologies that are safe and offer key benefits (e.g., greater yields, lower input costs). Finally, it aligns with Canada's international advocacy in promoting science-based approaches.

Support for this approach is not universal, however, and there are calls to regulate on the basis of market acceptance and other socio-economic factors. Some of these calls are based, directly or indirectly, on scepticism regarding the validity of the scientific evidence for the safety of the technology or product in question, even if such evidence has been judged by experts to be quite strong. Some have concerns about the way that technologies may be implemented by industry. For example, it is sometimes claimed that the views of some value chain members are not adequately considered in industry decision making related to commercialization and implementation. In addition, there are concerns that the potential benefits may not reach consumers (e.g., some critics of irradiation state that it may be used to relax general hygiene practices rather than improve food safety). Opposition is often expressed by stakeholder groups which have broader concerns about certain emerging technologies (e.g., nuclear technology, genetic engineering) and/or practices used in today's agriculture and food sector (e.g., "factory farming," food additives).

In contrast, many in industry have stressed the importance of maintaining and perhaps increasing Canada's commitment to a science-based approach. They contend that the approach to regulation in this area can, if not handled correctly, act as a disincentive to greater investment in research and development, and reduce Canadians' choice of and access to food products. Some industry stakeholders have maintained that there is a risk of losing business and product development opportunities in Canada to the U.S. Even with a strong commitment to the current science-based approach, some in industry have called for strategies to promote greater consumer understanding of novel products, new uses and emerging technologies in order to help overcome the consumer scepticism noted above.

While Canada should maintain its science-based regulatory regime, at the same time, consumer understanding and awareness of new technologies needs to be enhanced. Communication and science are needed to dispel myths and government can play a critical role in this regard.

Improving the interface between regulators and the regulated

Contact between regulators and businesses takes place face-to-face, over the phone, and increasingly, online. One of the most frequently discussed issues raised during the Red Tape Reduction Commission's consultations with businesses to identify irritants stemming from federal regulatory requirements, was the need for regulators to demonstrate a consistent level of responsive service and professionalism in their contacts with business.

Interaction between businesses and regulators span the regulatory life cycle, from the issuance of permits through the preparation of regulatory submissions and subsequent inspections and approvals. While businesses recognize that contact with regulators is part of doing business, they expect to be provided with responsive service and clear service standards without unreasonable delays. They also expect industry to be given a reasonable amount of time to adjust to new or amended regulations.

The need for increased regulatory-related transparency and predictability remains a key objective. The CFIA is moving in this direction. Members are pleased with the CFIA's work efforts in this area.

Small business constraints concerning compliance

Small businesses may face a number of challenges in meeting their regulatory obligations for a variety of reasons. Potential obstacles to compliance for small businesses include limitations related to human, financial and technical resources as well as time frames. In contrast, larger businesses may employ specialized expertise to help them understand and comply with legislative requirements. Small businesses generally rely on the information that is made available to them by the regulator or industry associations. Likewise it may be easier for larger businesses to innovate and adopt new methods of production or processing while maintaining compliance, since they have the requisite financial capital and infrastructure.

Members expressed their support for outcome-based rather than prescriptive regulations in order to lessen the regulatory burden on small businesses. They also indicated that regulatory enforcement should allow a certain degree of flexibility as industry works to address various issues.

Members support the CFIA's recognition that inspectors play a role as educators and not just enforcement officers.

All three levels of government should work together to avoid regulatory duplication and overlap.

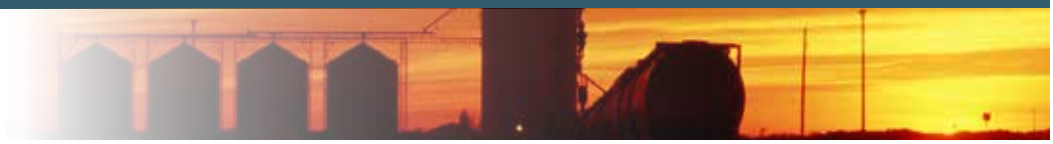
There may be opportunities to streamline definitions for claims and labels.

Novelty as a regulatory trigger for plants with novel traits

Plants intended for environmental release, for food and for livestock feed use in Canada are regulated under the Seeds Act, the Food and Drugs Act and the Feeds Act, respectively. The development of new plant products may be subject to the regulatory requirements under one or more of these acts. The regulatory trigger for each of these acts is "novelty." However, "novelty" is defined differently in all three acts, which makes it challenging for industry to determine which regulations they need to comply with, if any.

Canada is the only country that uses "novelty" as a regulatory trigger for plants; most other countries use the process of genetic engineering as the de facto trigger for regulatory oversight.

There is a need for a consistent definition of novelty to enable industry stakeholders to understand applicability and compliance requirements. Moreover, Canada's approach to "novelty" may be inhibiting innovation. During Committee deliberations, it was pointed out that, owing to Canada's approach based on novelty, there are many examples of products that are not approved in Canada but are approved in other countries. Further review of Canada's use of the concept of novelty is therefore warranted.



ANNEX B

Mr. John Knubley,
Deputy Minister
Industry Canada
235 Queen Street, 11th Floor
Ottawa, Ontario, Canada
K1A 0H5

Dear Mr. Knubley:

We are writing to you as the co-chairs of the Agri-Innovators Committee (AIC) to provide the committee's input towards a refreshed Federal Science and Technology (S&T) Strategy. At the same time, the committee would like to express its appreciation for the presentation provided by Mr. Robert Dunlop on June 20th, 2013 on this initiative.

We are pleased that this important federal initiative is underway to help strengthen and drive innovation efforts across all sectors. In particular, we are pleased that an enhanced business perspective is deemed an important part of this strategic update.

The AIC was convened in 2012 by Minister Ritz to provide advice on advancing innovation in the agriculture, agri-food and agri-based products sector. The committee is comprised of successful innovators from across Canada and an array of agricultural sub-sectors. One of the main objectives of the committee is to increase sector profitability and competitiveness. As such, the committee sees a link between its work and that being undertaken to refresh Canada's S&T Strategy.

On behalf of the AIC, we would like to share our priority themes for innovation, and our views on the continued relevance of the S&T Strategy.

Although natural resources were highlighted as a general priority in the S&T Strategy, subsequent sub-priorities developed by the Science, Technology and Innovation Council (STIC) in 2008 did not identify agriculture, agri-food and bio-based products. Today, the world is changing. Global concerns for food security and limited natural resources as well as tremendous demand-driven opportunities are creating a new dynamic for the sector and increasing investor attention. Canada is well positioned to capture these opportunities and overcome challenges, through innovation.

For example, as of 2011 the food processing industry was the largest manufacturing industry in Canada, and accounted for 16% of all manufacturing shipments and for two per cent of national GDP. In addition, it ranked as the largest manufacturing employer, employing approximately 290,000 Canadians. In order to remain globally competitive, Canadian food processors are constantly seeking to identify emerging innovative opportunities through the introduction of new products, such as functional foods and specialty products, relying on leading-edge R&D in their quest to be

fast-to-market. The committee regards a refreshed S&T strategy as a contributing factor in helping food processors to access the best science and technology, in order to remain at the frontier of new market offerings.

Moreover, a significant transformation and expansion of opportunities within the sector is taking place whereby sector participants are exploring opportunities to provide feedstocks used by the energy and manufacturing sectors to produce fuels, chemicals and materials. The burgeoning bio-economy sector is providing the sector with the opportunity to enter non-traditional value chains at different points, for example, as feedstocks, platform chemicals or intermediate products. Underpinning these opportunities is the sector's ability to access the science necessary to create the requisite strong research and development platforms. In the committee's opinion, a refreshed S&T Strategy should identify the agriculture, agri-food and agri-based products sector as a key priority.

The committee has identified four themes to advance innovation: regulatory reform; an investment climate conducive to innovation and competitiveness needs; public – private collaborations/clusters; and, an entrepreneurial culture that needs to be embraced. Although the remarks below are derived from experiences within the agriculture, agri-food, and agri-based products sector, they are also cross-cutting themes relevant to other economic sectors influenced by a refreshed Federal S&T Strategy.

Regulatory Modernization: A modern regulatory environment supports competitiveness, enables market access, and attracts research and investment. The current system, however, is generally seen as too slow, unpredictable, expensive, and not enabling access to inputs similar to competitors. Moreover, outdated and overly prescriptive regulations limit the ability of industry to adopt new innovative business practices, processes and technologies. A refreshed S&T Strategy could seek to address the linkage between innovation and regulation and facilitate stronger federal, provincial and municipal regulatory alignment in order to decrease the administrative burden on industry. Members of the committee recognize that simply removing regulations is not the answer and are encouraged by the numerous modernization efforts currently being undertaken by Health Canada, the Canadian Food Inspection Agency, and the work of the Canada-United States Regulatory Co-operation Council (RCC). Regulatory modernization must be persistent, determined, ongoing and aggressive in order to enable investments in science and technology to reach the marketplace.

Innovation and competitiveness friendly investment climate: The S&T Strategy, as part of its path forward, recognized the role of government in creating an enabling environment and investment climate. Committee members also recognized the importance of a pro-innovation and pro-investment business environment as a key driver to support industry-led innovation. To increase commercialization further, members noted that not only must chronic underinvestment be remedied, but other non-financial commercialization factors must also be addressed. Governments should provide accessible programming that moves at the speed of business; establish the right mix of policy and program instruments that leverage private investment; and, stimulate innovation without distorting the market and biasing investment decisions. Committee members provided examples, including the need for effective intellectual property (IP) protection to incent innovation and that, specific to agriculture, enhanced plant breeders' rights (PBR) would be a step toward enabling Canada to remain a world leader in agricultural innovation.

Members also raised the importance of linkages to other government departments' programs, such as the National Research Council's Industrial Research Assistance Program (IRAP), that could further assist the sector in accessing key services and funding in a timely manner. In addition, the committee noted the need for alignment with provincial programming. The committee supports the idea that all levels of governments, and various federal government departments, work to align application requirements, mutually recognize due diligence assessments, and collaborate more proactively in assessing applications that cover multiple jurisdictions and departments. Taken together, a "whole of government approach" would streamline the application process for sector participants and contribute to removing inefficiencies by reducing duplication and identifying R&D gaps.

Public-Private collaborations: Members recognized the importance of public-private collaborations in developing sustainable R&D funding models. In an effort to address the issue of the long term erosion of research infrastructure, capacity and funding, several models of collaboration were discussed within the AIC. The committee believes that government, academia and private sector collaborations are an effective way to drive innovation along the value-chain from research to commercialization. The need for partnerships, even at the early stages of research and development, between industry and academia are essential to instill a "drive-to-collaboration" and "fast-to-market" sensibility. Clusters are seen as a model that encourages industry-led organizations to mobilize a critical mass of often fragmented scientific and technical capacity from all players in order to respond to sector strategies and priorities. Integral to this is the role of strong, committed industry governance and structures that enable integration and collaboration to identify opportunities that exploit economies of scale.

While the original S&T Strategy raised the principle of encouraging partnerships in general, our recommendation is to highlight private sector involvement as a necessary partner in clusters, networks and collaborations - all of which increase the interconnectedness of the system to maximize Canada's vast innovation capacity.

Embracing an Entrepreneurial culture: We would like to re-affirm the relevance of the S&T Strategy's Entrepreneurial Advantage. Entrepreneurship drives innovation and innovation drives growth. A strong entrepreneurial culture is required to pursue new ideas and opportunities, and to improve the sustainability and profitability of innovative enterprises. The committee discussed the changing philosophy occurring with early adopters whereby a shift in mindset from solely a "production focus" to first understanding the markets and consumer demand is taking place. Given the rising importance of understanding markets and consumer demand, the dissemination of market and consumer intelligence is crucial to the advancement of innovation in the sector. The committee's discussions, however, have suggested that access to this information appears uneven across the sector.

Members suggest that sector leaders should continue to attract and develop both experienced innovators and young entrepreneurs to the sector, as people are the most important ingredient to innovation. Members raised the issue that the venture capital and investment community may perceive some distinct risk factors associated with agriculture, and a general lack of familiarity with the sector.

In closing, we would reiterate that agriculture today is a modern, innovative, and forward-looking sector. There are increasing opportunities due to the convergence of life sciences (including biotechnology and clean technology) with the need to address global issues, such as food, health, water, and energy.

Canada is well positioned to capture these opportunities and overcome challenges through its science and innovation investments.

The Committee looks forward to a refreshed S&T Strategy as we continue to develop advice and recommendations related to the agriculture and agri-food industry perspective.

Sincerely,

Travis Toews, Co-Chair Suzanne Vinet, Co-Chair

c.c.: The Honourable Gerry Ritz, PC, MP
Mr. Timothy Sargent, Associate Deputy Minister, Agriculture and Agri-Food Canada
Mr. Robert Dunlop, Assistant Deputy Minister, Industry Canada

Agri-Innovators Committee Membership List

Committee Co-chairs and Biographical Notes

Travis Toews, Beef, Alberta
Mr. Toews is past President of the Canadian Cattlemen's Association (CCA), an organization he has been involved with in a variety of roles since 2005. A member of AAFC's Beef Value Chain Roundtable, Mr. Toews chaired CCA's Foreign Trade Committee and served on the Domestic Agriculture Policy & Regulations and the Value Creation & Competitiveness committees. Mr. Toews has been a vocal advocate for ensuring the industry's competitiveness on the domestic and international fronts and fostering innovation in the beef sector. He has appeared before numerous Parliamentary and Senate Committees encouraging support for research and development and innovation to promote the long-term sustainability and growth of the Canadian beef industry. Prior to joining the CCA, Mr. Toews was involved with his provincial association, the Alberta Beef Producers, and up until January 2009, served as a Director with the Canada Agri-Food Trade Alliance (CAFTA). Mr. Toews and his family operate Melbern Holdings, a cow-calf operation in northwest Alberta. He is a designated member of the Society of Management Accountants.

Suzanne Vinet, Deputy Minister of Agriculture and Agri-Food Canada (September 2012 to April 2014)
Ms. Vinet has been with the federal public service for 28 years, during which she has held several senior positions. In recent years, she has served as Deputy Minister, Canada Economic Development for the Regions of Québec (2010–2012); Associate Deputy Minister of Transport, Infrastructure and Communities (2009–2010); Associate Deputy Minister at Health Canada (2007–2009); and Assistant Deputy Minister, Strategic Policy at Agriculture and Agri-Food Canada (2005–2007). Ms. Vinet began her public service career in 1984 with the Department of Agriculture and Agri-Food, where she gained extensive expertise in policy and liaison. She took on increasingly senior positions with a focus on trade policy. A native of Vaudreuil, Quebec, Ms. Vinet received a diploma from the Institut de Technologie agricole et alimentaire in Saint-Hyacinthe, and holds a Bachelor of Arts degree (economics) from Wilfrid Laurier University in Waterloo, Ontario. She also attended the National Defence College of Canada in Kingston.

Committee Members and Biographical Notes

Lloyd Affleck, Pulses, Saskatchewan
Mr. Affleck is Vice-President, Saskatchewan and Chairman of the Board of Canterra Seeds Holdings Ltd., a company specializing in pedigreed seed products from high yielding canola and has a versatile portfolio of cereals, pulses and other crop types. Mr. Affleck, who is a member of the Special Crops Value Chain Roundtable, was a founding member of the Western Marketing and Processing Association and also served as director of Saskatchewan Pulse Growers from 2002 to 2008. He was then appointed as a Pulse Canada Representative, serving as vice-chair for three years and chairman for another three. Mr. Affleck has been farming for 40 years and represents the third generation of a four generation farming operation with some 3,400 acres of cropland on a four-year rotation including cereals, pulses and oilseeds. In 1993–1994, Mr. Affleck was a member of a Federal Government Special Crop Initiative Project and then served as a member and chair of the Special Crop Rural Initiative program.

Shelley Doan, Livestock and Genetics, Ontario
Ms. Doan is President of Trans World Cattle Company Ltd., a company that exports Canadian dairy cattle to countries around the world including Mexico, Iran, Korea, Venezuela, Morocco, China and the United States. Family owned and operated, the company grew out of Walker Dairy Sales, which has been in business in southwestern Ontario for close to half a century. Ms. Doan has been actively involved with the Canadian Livestock Genetics Association (CLGA), a nationwide, not-for-profit trade association representing the market access and animal health interests of those involved in the sale, service and promotion of livestock genetics both domestically and internationally. Its members work together to continuously improve the livestock genetics industry by providing high quality live animals and genetic products to customers in more than seventy countries. Ms. Doan is a former President and Director of the CLGA, and was on the frontline as the organization worked to help restore Canadian cattle export access to the United States and Mexico.

David Fuller, Chicken, Nova Scotia
Mr. Fuller is former Chair of the Chicken Farmers of Canada (CFC), a position he held as of 1999 during a period that saw some of the most critical challenges facing the Canadian chicken industry. He continues to operate the family farm in Nova Scotia's Annapolis Valley started by his father over 50 years ago. During his tenure, Mr. Fuller also played a role in the CFC's commitment to research and innovation, including the Canadian Poultry Research Council that was established in 2001 by the five national poultry organizations in Canada. Fuller participated in a number of international trade and agriculture events, including the World Trade Organization Ministerial Conferences held in Seattle, Cancun, Hong Kong and Geneva, numerous Cairns Group Farm Leaders meetings, International Federation of Agricultural Producers conferences and the World Poultry Congress. Mr. Fuller was a driving force behind the strategic development of CFC's vision and its role in Canadian agriculture.

Don Kenny, Grains, Ontario
Mr. Kenny is the former founding chair and current director of the Grain Farmers of Ontario (GFO), an organization which represents Ontario's 28,000 corn, soybean and wheat producers, whose crops generate over $2.5 billion in farm-gate receipts and result in over $9 billion in economic output. Mr. Kenny and his family operate a fifth generation century-old farm in West Ottawa. He played a leading role in bringing the three producer groups under one umbrella. Kenny has had a long-time interest in innovation and research, and co-chaired the Canadian Seed Trade Association 2011 Partners in Innovation conference. As well, he was heavily involved in the founding of Farmers for Investment in Agriculture (FIA), made up of the Fédération des producteurs de culture commerciales du Québec, Grain Farmers of Ontario, the Atlantic Grains Council, and the Grain Growers of Canada. Made up of over 100,000 farmers, it was formed in 2010 to address the need for greater investment in agronomic research.

Shaun Moran, Grains, Manitoba
Mr. Moran is a fifth generation farmer and President of the Portage la Prairie based Moran Commodities Corporation. Mr. Moran bought his first farm at age 17 and has been in the farming business ever since, today living on and operating the family's Centennial Farm. During the early 1980s when wheat prices were depressed, he decided to look beyond traditional grain crops to potential alternatives. Mr. Moran developed a passion for marketing and created a family-based special crops business, diversifying into pulses and spices and exporting these commodities around the world. The

company quickly became a major player in the spice business, especially caraway and coriander, helping to turn the North American industry into a net exporter worldwide. Mr. Moran, who started his education in a one-room schoolhouse, was a Dean's Honour Roll graduate of the University of Manitoba.

Réjean Picard, Greenhouse, Ontario
Réjean (Rej) Picard is the former Chief Executive Officer of Westbrook Greenhouse Systems, **Grimsby Ontario**. Mr. Picard was born and raised in St. Catherines and has been with The Westbrook Group since 1975. He is a member of the Niagara Region Agriculture Sub-Committee, a member of the Regional Chair's Agricultural Task Force, the Chair of The Ontario Greenhouse Alliance, Chair of McNally House Community Hospice in Grimsby, and a board member of the Seeley Conference, Cornell University, Ithaca, NY.

Jim Thorne, Food Processing Ontario
Mr. Thorne is President and Chief Executive Officer of Marsan Foods Limited, one of North America's leading suppliers of custom branded frozen meal solutions for the retail, foodservice, airline and healthcare markets. Marsan has been named one of Canada's 50 Best Managed companies. It has been in business since 1970 and is 100 per cent Canadian owned. Marsan has annual sales of about $75 million and 120 employees. Mr. Thorne has more than two decades of experience in the North American food business. Previously, he held senior management positions with Maple Leaf Foods, Campbell Soup Company and Nabisco Ltd. He is a graduate of Queen's University with an MBA. He is on the Board of Directors of the Food Processors of Canada. He is also the Industry Co-Chair of the AAFC's Food Processing Industry Roundtable. He has also recently agreed to co-chair the Canada-Brazil Consultative Committee on Agriculture, a mechanism established in 2006 to exchange information, facilitate trade, and promote economic and commercial cooperation between the two countries.

Bill Vanderkooi, Processor, British Columbia
Mr. Vanderkooi is a former dairy producer and current President and CEO of Nutriva Group and Vitala Foods, a group of grassroots companies developing, producing and bringing healthy foods to the world with first-to-market innovations in the dairy and egg category. They are driven by a commitment to a healthy planet, key partnerships, customer relationships and strategic brand development. In 2011, Mr. Vanderkooi was chosen by his peers to be the recipient of the Award of Excellence for Innovation in Agriculture and Agri-Food from the Investment Agriculture Foundation of B.C. and the 2011 BC Food Processors Hall of Fame Innovation Award. In 2012, Vitala Foods was awarded Best New Product Award for VitaD Sunshine Eggs, at the Canadian Grand Prix New Product Awards. Mr. Vanderkooi is currently partnering with Science World BC to enhance the EcoDairy agritourism and education project in Abbotsford. He attended Dordt College in Iowa before going to graduate school at Michigan State University, where he earned a Master of Science degree in animal science.

David Vincent, Pork, Quebec
Mr. Vincent is a director with the *Fédération des producteurs de porcs du Québec* for the Central Quebec region and a municipal councillor for the community of Sainte-Séraphine. The *Fédération des producteurs de porcs du Québec* represents the interests of 3,500-plus pork producers. Quebec's pork producers raise over 7.3 million hogs per year and generate economic benefits amounting to over $1.25 billion across the province. The pork industry in Quebec employs some 19,800 people. After growing up on his parents' farm, Mr. Vincent is today working with the family business which specializes in pork production and also has 2,500 acres of land planted to corn and soybeans. The pork business includes 6,000 hogs and 450 sows. Mr. Vincent is a graduate of the Faculty of Agricultural and Environmental Sciences at the MacDonald campus of McGill University.

Rick White, Canola, Saskatchewan
Mr. White has been General Manager of the Canadian Canola Growers Association (CCGA) since 2008. He first joined the CCGA in 2003 as the Director of Policy Development, where he was responsible for the organization's national policy development and advocacy activities. In his position, Mr. White is responsible for the overall management and operations of CCGA. Canola is a made-in-Canada success story, which the CCGA directly attributes to innovation and rapid adoption of new technology which improved profitability, sustainability and competitiveness. Mr. White has conveyed this message to a number of Parliamentary Committees on agricultural issues. His career has seen him serve in positions with the University of Saskatchewan, the Canadian Wheat Board, Agricore Cooperative Ltd, and the Association of Manitoba Municipalities. Mr. White has a Bachelor of Science degree in Agriculture and a Master of Science degree from the University of Saskatchewan, both majoring in Agricultural Economics. He continues to own and operate a share of the family grain farm in southeastern Saskatchewan.

Presentations to the Committee

Bergen, Reynold, Beef Cattle Research Council and Beef Agri-Science Cluster. *Canada's Beef Science Cluster*, June 20, 2013.

Boland, William P, University of Saskatchewan. *Public-Private-Producer Partnerships (P4s) in Canada*, June 20, 2013.

Brandle, Jim, Chief Executive Officer, Vineland Research and Innovation Centre. *The New Vineland, Better plants. Better Life*, February 11, 2013.

Breukelman, David, President, Business Arts. *Innovation*. October 18, 2013.

Carberry, Robert, Assistant Secretary, Privy Council Office, Regulatory Cooperation Council Secretariat. *Perimeter Security and Economic Competitiveness*, February 11, 2013.

Dunlop, Robert, Assistant Deputy Minister, Science and Innovation Sector, Industry Canada. *Renewing the Federal Science and Technology Strategy*, June 20, 2013.

Elrick, Marc, Principal and Founder, Critical Path Group. *Global Opportunity & Growth Markets & Industry Reinvention*, October 18, 2013.

Farn, Calla, Vice President, Government/Public Relations and Corporate Affairs, McCain Foods. *Improving the Competitiveness of the Canadian Potato Industry*, October 18, 2013.

Glover, Paul, Associate Deputy Minister, Health Canada. *Regulatory Roadmap for Health Products and Food (HPFB)*, February 11, 2013.

Gooch, Martin, Chief Executive Officer, Value Chain Management International. *Agri-Innovators Committee*, October 18, 2013.

Good Bruce, Executive Director, Centre for Business Innovation. *The State of Firm-level Innovation in Canada*, October 18, 2013.

Hepworth, Lorne, President, CropLife Canada. *The Investment Climate for Plant Science Innovation*, October 18, 2013.

Howe, Nicole, Senior Policy Analyst, Strategic Policy Branch, AAFC. *Innovation Capacity Project on Canada's Agriculture, Agri-Food and Agri-based Products Sector,* June 20, 2013.

Mayers, Paul, Associate Vice-President, Programs, Canadian Food Inspection Agency. *Update on Regulatory Modernization at the CFIA*, February 11, 2013.

McDougall, John, R. President, National Research Council. *Canadian Wheat Strategic Alliance*, February 11, 2013.

Meredith, Greg, Assistant Deputy Minister, Strategic Policy Branch, AAFC. *Strategic Approach to AAFC Benchmarking Activities*, June 20, 2013.

Moritz, Rita, Assistant Deputy Minister (now retired), Farm Financial Programs Branch, AAFC. *Growing Forward 2 Federal Programs*, February 11, 2013.

Verner, Jenny, President, Specialty Seeds and Oils, Cargill Canada. *Agri-Innovators Committee*. October 18, 2013.

Zafirou, Margaret (now retired), Chief, Strategic Policy Branch, AAFC. *Measuring Innovation in Canada's Agriculture and Agri-Food Industry*, June 20, 2013.

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